

	Type	L #	Hits	Search Text	DBs
1	BRS	L1	3659	dummy near5 data	USPAT
2	BRS	L2	230	1 and dvd	USPAT
3	BRS	L3	28	2 and guard	USPAT
4	BRS	L4	17101	preamble	USPAT
5	BRS	L5	2	3 and 4	USPAT
6	BRS	L6	4548	dummy near5 data	US-P GPUB ; EPO; JPO; DERW ENT; IBM_ TDB
7	BRS	L7	326	6 and dvd	US-P GPUB ; EPO; JPO; DERW ENT; IBM_ TDB
8	BRS	L8	15	7 and guard	US-P GPUB ; EPO; JPO; DERW ENT; IBM_ TDB
9	BRS	L9	3	8 and preamble	US-P GPUB ; EPO; JPO; DERW ENT; IBM_ TDB

	Time Stamp	Comments	Error Definition	Errors
1	2004/07/27 08:14			0
2	2004/07/27 08:12			0
3	2004/07/27 08:12			0
4	2004/07/27 08:12			0
5	2004/07/27 08:12			0
6	2004/07/27 08:14			0
7	2004/07/27 08:14			0
8	2004/07/27 08:15			0
9	2004/07/27 08:15			0

**CLASS 430 RADIATION IMAGERY CHEMISTRY:
PROCESS, COMPOSITION, OR PRODUCT THEREOF****1 HOLOGRAPHIC PROCESS, COMPOSITION, OR
PRODUCT**

- 2 . Composition or product or process of making the
same

**3 USE OF SOUND OR NONDIGITAL COMPRESSIVE
FORCE****4 RADIATION MODIFYING PRODUCT OR PROCESS
OF MAKING**

- 5 . Radiation mask
- 6 . Screen other than for cathode-ray tube
- 7 .. Color

**8 MICROGRAPHY, PROCESS, COMPOSITION, OR
PRODUCT OTHER THAN MICROELECTRONIC DEVICE
MANUFACTURE****9 IMAGED PRODUCT**

- 10 . Antifraud or antitampering
- 11 . Structurally defined
- 12 .. Nonuniform or noncoextensive layer added to
finished imaged product
- 13 . Image contained within transparent base
- 14 . Multilayer
- 15 .. Plural image layers
- 16 . Deposited metal coating on image
- 17 . Nonsilver image
- 18 . Including resin or synthetic polymer

19 ERASABLE IMAGING**20 LIQUID CRYSTAL PROCESS, COMPOSITION, OR
PRODUCT****21 RETRIEVING IMAGE MADE USING RADIATION
IMAGERY****22 REGISTRATION OR LAYOUT PROCESS OTHER
THAN COLOR PROOFING****23 PRODUCING CATHODE-RAY TUBE OR ELEMENT
THEREOF**

- 24 . Using specific control or specific modification of
exposure, i.e., by manipulation of radiation source or
exposure through elements other than shadow mask

- 25 . With light-absorbing matrix on faceplate

- 26 .. With faceplate of phosphoric stripes

- 27 . With filter material on finished faceplate

- 28 . Using specified radiation-sensitive composition
other than a nominal sensitized polyvinyl alcohol

- 29 . Using specified post-imaging process composition

**30 INCLUDING CONTROL FEATURE RESPONSIVE TO
A TEST OR MEASUREMENT**

wherein nonchemical invisible radiant energy imaging of a medium produces an electrical potential difference or a current flow; subclasses 199 + and 458 + for device or process wherein a nonchemical image is retrieved or detected using light-wave communication such as with a photocell; and subclasses 472 + for device or process wherein nonchemical invisible radiant energy imaging of a medium produces a nonelectrical response.

- 352, Optics: Motion Pictures, 1+ for nonchemical sound recording or reproduction combined with motion pictures.
- 353, Optics: Image Projectors, 25+ for process and system involving selective retrieval of information; and subclass 121 for methods of optically retrieving information by projection wherein the information is in the form of a nonchemical image.
- 355, Photocopying, 5 for electric photocopying apparatus combined with means to project reproduced image onto a screen or display means for viewing.
- 359, Optics: Systems (Including Communication) and Elements, 290+ for optical retrieval of nonchemical image wherein a means is used to change the optical properties of the medium during retrieval.
- 360, Dynamic Magnetic Information Storage or Retrieval, for nonchemical magnetic dynamic information storage and retrieval process and system, especially 1+ for process and device used to store or retrieve the image wherein the device has an additional utility than as a magnetic record carrier such as a photographic image medium; and subclasses 131 + for specific structure of magnetic record card other than mere magnetic coatings on a substrate.
- 365, Static Information Storage and Retrieval, for nonchemical magnetic, electrical, or optical static information storage and retrieval process or system, especially 185.01+ for floating gate memory storage (e.g., flash memory), subclasses 185.01 + for floating gate memory storage (e.g., flash memory), subclasses 106 + and 120 + wherein radiant energy and information masking are utilized.

22

REGISTRATION OR LAYOUT PROCESS OTHER THAN COLOR PROOFING:

This subclass is indented under the class definition.

Processes having a step recited for registering one or more images with each other or with the radiation-sensitive medium to be imaged.

- (1) Note. Color proofing is provided for elsewhere in the class.

SEE OR SEARCH THIS CLASS, SUBCLASS:

143, and 358, for color proofing.

SEE OR SEARCH CLASS:

- 346, Recorders, 14 , 54, 60, 61, and 94 + for registration feature for that class.

US-PAT-N

DOCUMENT

TITLE:



US006521385B2

(12) **United States Patent**
Yoshida et al.

(10) Patent No.: **US 6,521,385 B2**
(45) Date of Patent: **Feb. 18, 2003**

TITLE -
Posi
exposure

Brief Su
The p
detectin
readable
particul
and the
formed o
position
programs
the expo

Brief Su
In th
reticle
perform
lithogra
associat
circuit
Then, th
of the w

Brief Su
At pr
the wafe
on the i
alignmen
of the p
image is
procedur
template
image is
paramete
image pi

(54) **POSITION DETECTING METHOD,
POSITION DETECTING UNIT, EXPOSURE
METHOD, EXPOSURE APPARATUS, AND
DEVICE MANUFACTURING METHOD**

(75) Inventors: Kouji Yoshida, Tokyo (JP); Yuuji
Kokumai, Kawasaki (JP)

(73) Assignee: Nikon Corporation, Tokyo (JP)

(*) Notice: Subject to any disclaimer, the term of this
patent is extended or adjusted under 35
U.S.C. 154(b) by 68 days.

(21) Appl. No.: 09/735,651

(22) Filed: Dec. 14, 2000

(65) Prior Publication Data

US 2001/0007734 A1 Jul. 12, 2001

(30) Foreign Application Priority Data

Dec. 14, 1999 (JP) 11-354138
Nov. 28, 2000 (JP) 2000-360895

(51) Int. Cl. G03F 9/00; G01B 11/00;
G01J 1/00

(52) U.S. Cl. 430/22; 430/30; 250/491.1;
250/492.2; 250/492.22; 356/400

(58) Field of Search 430/22, 30; 250/491.1,
250/492.2, 492.22; 356/400

(56) References Cited

U.S. PATENT DOCUMENTS

5,493,403 A 2/1996 Nishi 356/401

FOREIGN PATENT DOCUMENTS

JP 6-151274 5/1994
JP 10-300427 11/1998

Primary Examiner—Christopher G. Young

(74) Attorney, Agent, or Firm—Obkon, Spivak, McClelland,
Maier & Neustadt, P.C.

(57) **ABSTRACT**

The imaging signal (the raw waveform) and the modified waveform are obtained, wherein the raw waveform is obtained from the image of the mark which is picked-up by the image pick-up device, and the modified waveform is obtained through the modification of the imaging signal by the waveform modifying unit. By using respective raw waveform and modified waveform, the mark information calculating unit obtains the mark information for the mark position such as estimated mark position and so forth. Then, the position calculating unit detects the positional information of the mark based on the plural mark information in the obtained mark information. As a result, the mark position might be precisely detected depending on the figure of the noise signal.

45 Claims, 9 Drawing Sheets

430
22

US-PAT-N

DOCUMENT

TITLE:

(12) **United States Patent**
Miyashita et al.(10) Patent No.: **US 6,706,456 B2**
(45) Date of Patent: **Mar. 16, 2004**

US006706456B2

TITLE -

Meth
manufact

Brief Su

The p
conditio
medium,
transfer
that exp
method,
storage

Brief Su

Yet f
manufact
producti

Brief Su

In an
of this
the phot
photo-re
developi
photo-re
or the l
not limi
optical

Brief Su

In th
the phot
photo-re
developi
photo-re
or the l
not limi(34) **METHOD OF DETERMINING EXPOSURE
CONDITIONS, EXPOSURE METHOD,
DEVICE MANUFACTURING METHOD, AND
STORAGE MEDIUM**(75) Inventors: Kazuyuki Miyashita, Chuo-ku (JP);
Takashi Mikuchi, Ageo (JP)

(73) Assignee: Nikon Corporation, Tokyo (JP)

(*) Notice: Subject to any disclaimer, the term of this
patent is extended or adjusted under 35
U.S.C. 154(b) by 0 days.

(21) Appl. No.: 10/407,434

(22) Filed: Apr. 7, 2003

(65) Prior Publication Data

US 2003/0170552 A1 Sep. 11, 2003

Related U.S. Application Data(63) Continuation of application No. PCT/JP01/08765, filed on
Oct. 4, 2001.

(30) Foreign Application Priority Data

Oct. 5, 2000 (JP) 2000-306612

(51) Int. Cl.⁷ G03F 9/00; G03C 5/00

(52) U.S. Cl. 430/30

(58) Field of Search 430/30

(56)

References Cited**FOREIGN PATENT DOCUMENTS**

JP	11-008154	1/1999
JP	11-233434	8/1999
JP	11-325870	11/1999
JP	2000-124103	4/2000

Primary Examiner—Christopher G. Young

(74) Attorney, Agent, or Firm—Obilon, Spivak, McClelland,
Maier & Neustadt, P.C.

(57)

ABSTRACT

While changing a focus position and a dose amount on the image plane by respective amounts, a mark including a measurement pattern and a reference pattern is transferred sequentially onto a plurality of part areas arranged in a matrix on a wafer via the projection optical system. And after the wafer is developed, an image of each of the plurality of part areas on the wafer developed is picked up, and matching with a template is performed on the image datum of each part area. Because a feature which does not disappear even with having been overexposed and of which the positional relation with the measurement pattern is known is used as the reference pattern, template-matching can be readily performed on the image datum of each part area by using the reference pattern as a reference, and an exposure condition under consideration (the best focus position) is determined based on the matching results, objective and quantitative, for the part areas (steps 237 through 249).

52 Claims, 18 Drawing Sheets

Drawing Des
FIG. 3C
angular vel
optical rea

Drawing Des
FIG. 3D
system cons
optical pic
information
Zoned Const

Drawing Des
FIGS. 15
method of m
using CLC m

Drawing Des
FIG. 17I
recorded on
Constant An

Drawing Des
FIG. 27A
storage dis
alignment m

Drawing Des
FIG. 27B
and second

Drawing Des
FIG. 27C
subsystem f
sides of th

Drawing Des
FIG. 27E
subsystem h
sides of do
operations

Drawing Des



US006498775B1

(12) **United States Patent**
Fan et al.

(10) Patent No.: **US 6,498,775 B1**
(45) Date of Patent: ***Dec. 24, 2002**

(54) **MULTI-LAYER OPTICAL RECORDING
MEDIA AND SYSTEM FOR RECORDING
AND REPRODUCING INFORMATION DATA**

(75) Inventors: Bunsen Fan, Cordandt Manor, Sading
M. Faria, Picasantville, both of NY
(US)

(73) Assignee: Reveo, Inc., Elmford, NY (US)

(*) Notice: This patent issued on a continued prosecution application filed under 37 CFR 1.53(d), and is subject to the twenty year patent term provisions of 35 U.S.C. 154(a)(2).

Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 0 days.

(21) Appl. No.: 09/141,063

(22) Filed: Aug. 27, 1998

Related U.S. Application Data

(63) Continuation of application No. 08/539,279, filed on Oct. 4, 1995, now Pat. No. 5,838,653.

(51) Int. Cl.⁷ G11B 3/74

(52) U.S. Cl. 369/94; 369/275.1

(58) Field of Search 369/94, 275.1,
369/280, 281, 288, 109, 14; 365/108

(56) **References Cited**

U.S. PATENT DOCUMENTS

4,450,553 A 5/1984 Holster et al.
5,107,483 A 4/1992 Nakajima et al.
5,202,875 A 4/1993 Rosen et al.
5,255,262 A 10/1993 Best et al.
5,353,247 A * 10/1994 Patis 365/108

5,373,499 A 12/1994 Immano et al.
5,381,401 A * 1/1995 Best et al. 369/275.1
5,485,452 A * 1/1996 Masda 369/284
5,487,060 A * 1/1996 Rosen et al. 369/118
5,526,338 A * 6/1996 Huxman et al. 369/109
5,838,653 A 11/1998 Fan et al.
6,005,838 A 12/1999 Fan et al.
6,094,410 A 7/2000 Fan et al.

OTHER PUBLICATIONS

NEW COMPOUND BRIGHTENS OUTLOOK FOR PHOTOREFRACTIVE POLYMERS by not indicated, Physics Today, 1995, pp. 17-20.

MULTILEVEL VOLUMETRIC OPTICAL STORAGE by Kurt A. Rubin, et al., SPIE vol. 2338 Optical Data Storage, vol. 2338, 1994, pp. 247-259.

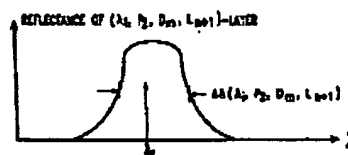
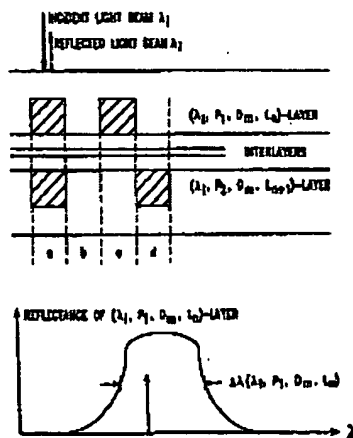
* cited by examiner

Primary Examiner—Tan Dinh

(57) **ABSTRACT**

Disclosed is a novel multi-layered optical recording media and system for recording and reproducing information data. The multi-layered optical recording media has M information storage decks, and each information storage deck has N information storage layers, and each information storage layer has a pair of information storage structures. Each paired information storage structure has a characteristic wavelength and polarization state, and from which recorded information can be read by a laser beam having similar wavelength and polarization-state characteristics. In the illustrative embodiment, the multi-layered optical recording media of the present invention has $M \times N \times 2$ information storage layers which can be read using only N laser lines (i.e. spectral components), thereby providing a 2M-fold increase in information storage capacity over prior art systems. The information storage and retrieval system of the present invention is completely backward compatible to allow for the reading of conventional CD-ROM devices.

16 Claims, 47 Drawing Sheets



US-PAT-N

DOCUMENT

TITLE:

Brief Su
Anoth
manufact
polariza

Brief Su
Anoth
manufact
wavelength
material

Drawing
FIG.
angular
optical

Drawing
FIG.
system c
optical
informat
Zoned Co

Drawing
FIGS.
method o
using CL

Drawing
FIG.
recorded
Constant

Drawing
FIG.



US006094410A

United States Patent [19]

Fan et al

[11] Patent Number: 6,094,410

[45] Date of Patent: Jul. 25, 2000

[54] **MULTI-LAYER OPTICAL RECORDING
MEDIA AND METHOD FOR RECORDING
AND REPRODUCING INFORMATION USING
THE SAME**

5,487,060 1/1996 Rosen et al. 369/94
5,526,338 6/1996 Hasman et al. 369/275.1

[75] Inventors: Bunsen Fan, Cortlandt Manor; Sadeq
M. Faris, Picasantville, both of N.Y.

[73] Assignee: Reveo, Inc., Elmsford, N.Y.

[21] Appl. No.: 09/141,570

[22] Filed: Aug. 27, 1998

Related U.S. Application Data

[63] Continuation of application No. 08/539,279, Oct. 4, 1995,
Pat. No. 5,838,653.

[51] Int. Cl.⁷ G11B 3/74

[52] U.S. Cl. 369/94; 369/275.1

[58] Field of Search 369/94, 275.1,
369/109, 281, 284, 280, 286, 288; 365/108,
109, 110, 111

[56] References Cited

U.S. PATENT DOCUMENTS

5,353,247 10/1994 Faris 365/108
5,581,401 1/1995 Best et al. 369/275.1
5,485,452 1/1996 Maeda 369/275.1

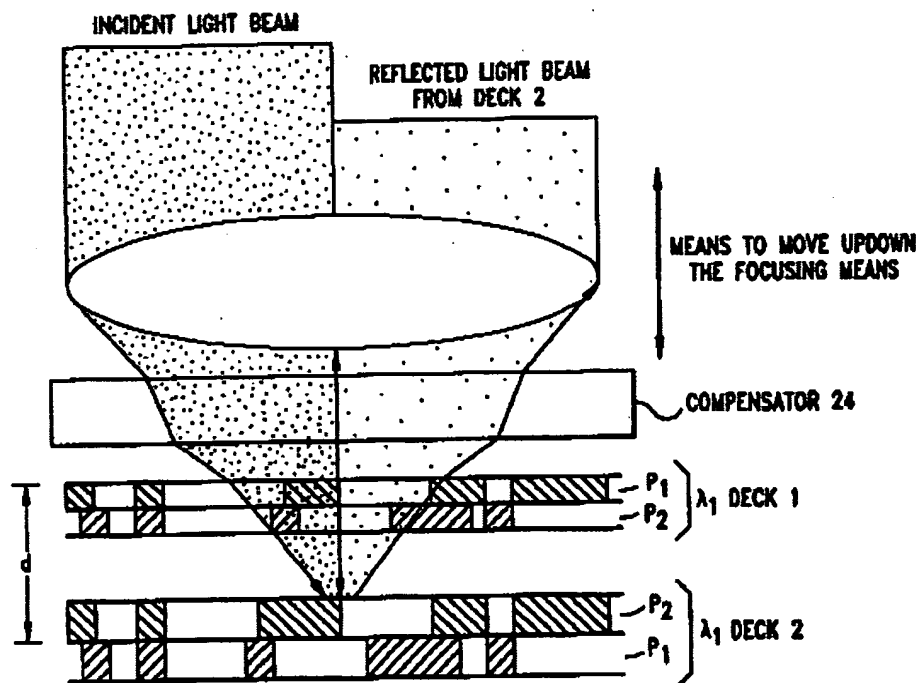
Primary Examiner—Tan Dinh

Attorney, Agent, or Firm—Thomas J. Peckowski, Esq., P.C.

[57] ABSTRACT

Disclosed is a novel optical information storage media having M information storage decks. Each information storage deck has N information storage layers, and each information storage layer has a pair of information storage structures. Each paired information storage structure has a characteristic wavelength and polarization state, and from which recorded information can be read by a laser beam having similar wavelength and polarization-state characteristics. A novel system is provided for reading the optical information storage media of the present invention. In the illustrative embodiment, an optical storage device of the present invention having MxN>2 information storage layers can be read using only N laser lines (i.e. spectral components), thereby providing a 2M-fold increase in information storage capacity over prior art systems. The information storage and retrieval system of the present invention is completely backward compatible to allow for the reading of conventional CD-ROM devices. Various techniques are disclosed for manufacturing and reading the optical storage devices of the present invention.

4 Claims, 47 Drawing Sheets



US-PAT-N

DOCUMENT

TITLE:

Brief Su
Anoth
manufact
polariza

Brief Su
Anoth
manufact
wavelength
material

Brief Su
Anoth
manufact
the wave
multilay

Drawing
FIG.
angular
optical

Drawing
FIG.
system c
optical
informat
Zoned Co

Drawing
FIGS.
method o
using CL

Drawing



US006005838A

United States Patent [19]

Fan et al.

[11] Patent Number: 6,005,838

[45] Date of Patent: Dec. 21, 1999

[54] MULTI-LAYERS OPTICAL RECORDING
MEDIA AND SYSTEM FOR RECORDING
AND REPRODUCING INFORMATION DATA

\$,487,060 1/1996 Rosen et al. 369/94
\$,526,338 6/1996 Hasman et al. 369/109

Primary Examiner—Tan Dinh
Attorney, Agent, or Firm—Thomas J. Perkowski, Esq., P.C.

[75] Inventors: Bunsen Fan, Cortlandt Manor; Sadeg
M. Faris, Pleasantville, both of N.Y.

[73] Assignee: Reveo, Inc., Elmsford, N.Y.

[21] Appl. No.: 09/141,446

[22] Filed: Aug. 27, 1998

Related U.S. Application Data

[63] Continuation of application No. 08/539,279, Oct. 4, 1995,
Pat. No. 5,838,653.

[51] Int. Cl.⁶ G11B 7/24

[52] U.S. Cl. 369/275.1; 369/94; 365/108

[58] Field of Search 369/275.1, 94,
369/109, 110, 103, 102, 14, 273, 272, 280,
281, 284; 365/108

[56] References Cited

U.S. PATENT DOCUMENTS

\$,353,247 10/1994 Paris 365/108
\$,381,401 1/1995 Best et al. 369/275.1
\$,485,452 1/1996 Maeda 369/275.1

[57] ABSTRACT

An novel optical information storage media having M information storage decks. Each information storage deck has N information storage layers, and each information storage layer has a pair of information storage structures. Each paired information storage structure has a characteristic wavelength and polarization-state characteristics. A novel system is provided for reading the optical information storage media of the present invention. In the illustrative embodiment, an optical storage device of the present invention having M×N×2 information storage layers can be read using only N laser lines (i.e. spectral components), thereby providing a 2M-fold increase in information storage capacity over prior art systems. The information storage and retrieval system of the present invention is completely backward compatible to allow for the reading of conventional CD-ROM devices. Various techniques are disclosed for manufacturing and reading the optical storage devices of the present invention.

67 Claims, 47 Drawing Sheets

